the median JI for BS had increased to 0.67 (range 0.65 - 0.70) and the median JI for CT1 had increased to 0.70 (range 0.66 - 0.75).  

**Conclusions:** Target volume delineation varies significantly in head and neck radiotherapy trials. However, it appears that detailed RTQA feedback does improve clinician conformity within the pre-accurrual period.

**PO-0938**

**Use of deformation metric for head and neck atlas selection**

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**Materials and Methods:** 33 structures were contoured to atlas standard according to RTOG guidelines for 10 Head and Neck subjects. A leave-one-out approach was used to auto-contour each case using an atlas-based contouring system (RTx, Mirada Medical, Oxford, UK). Thus, 90 cases with manual ground truth results were available for assessment. The Dice similarity between the patient and selected atlas was calculated on the case as a whole. The mean and maximum absolute deformation distance after rigid registration were measured. The correlation between the deformation metrics and the Dice similarity were calculated using Spearman rank correlation coefficient.  

**Results:** The average Dice similarity for the case as a whole was 0.79. The average and maximum absolute deformations were 16.90 mm and 59.31 mm respectively. The Spearman rank correlation coefficient was -0.11 for Dice versus mean and 0.02 for Dice versus max.  

**Conclusions:** Poor correlation was found between the deformation metrics and the Dice similarity, suggesting that these metrics are not suitable for atlas selection on a whole case basis for head and neck cancer. These deformation metrics may reflect change in patient positioning and may be more appropriate to measure deformation for individual structures as a method of assessing similarity.

**PO-0939**

**Factors of importance for the need for adaptive re-planning in head and neck IMRT**

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**Materials and Methods:** Since 2009, we have used daily CBCT for all head and neck cancer IMRT. The daily CBCT acquired at the treatment couch is compared by the Radiation Therapists (RTT) with the planning CT by the using automatic rigid 3D match on the bony anatomy followed by couch shift and treatment delivery. If consecutive daily match results show deviations in the patient anatomy of more than 5 mm, re-planning is performed on either the pre-scheduled mid-course CT or extra CT acquired at the time of observed deviations. A systematic review through the patient records of 377 CBCT scans identified 36 patients (10%) with at least one re-plan during the treatment course. Tumor site, TNM stage, age, body weight twice weekly, HPV status and medication during treatment were collected from patient records and CBCT scans were reviewed off-line. From the daily CBCTs in the online matched positions, changes in the bony anatomy were measured and flagged relative to bony anatomy. The movement was then related to variation of bladder and rectal filling. The frequency of potential geographic misses was calculated assuming a 1 cm CTV to PTV margin except 0.5 cm posteriorly.  

**Results:** The mean movement of the prostate bed in the anterior/posterior (A/P), superior/inferior (S/I) and left/right (L/R) directions was: upper portion: 0.50 cm, 0.28 cm, and 0.10 cm respectively, and lower portion: 0.18 cm, 0.18 cm, and 0.08 cm. Most geographic misses occurred in the upper and lower prostate bed in the A/P direction. Geographic miss occurred in the upper prostate bed in 18.0%, 1.1%, and 0% of images respectively, and in the lower prostate bed in 1.9%, 0%, and 0% of images respectively. In the upper prostate bed, variations in bladder filling of >2 cm larger, >1 cm, or >2 cm smaller occurred in 3.5%, 55.7%, and 15.4% of images respectively. These variations in bladder filling resulted in geographic misses in 61.5%, 9.5% and 27.6% of these images respectively. In the upper prostate bed, variations in rectal filling of >1.5 cm larger, 1.1 cm larger to 1 cm smaller, and >1 cm smaller occurred in 17.8%, 75.1%, and 7.1% of images respectively. These variations in rectal filling resulted in geographic misses in 28.4%, 12.4%, and 63.0% of these images respectively. Bladder and rectal size variation had minimal impact in the lower prostate bed, with less than 2% of all images demonstrating a potential geographic miss.  

**Conclusions:** Greatest movement occurred in the upper prostate bed especially in the A/P direction. Potential geographic miss occurred in 20.2% of all images with a 0.5 cm posterior margin. Bladder and rectal size changes had greatest potential for geographic miss seen when the bladder increases or the rectum decreases. Therefore ensuring a full bladder and empty rectum at simulation could significantly decrease the frequency of potential geographic miss.

**PO-0941**

**A prospective analysis of inter and intrafractional errors to calculate CTV to PTV margin in HH cancer patients**

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**Materials and Methods:** Twenty-three consecutive patients with HH tumors were analysed. Patients were immobilized with a thermoplastic mask fixed using thermoplastic material. A thermoplastic mask fixed using thermoplastic material was placed on the table of the linac. Two orthogonal (anterior-posterior, and lateral) set-up fields were used for the isocenter’s verification. Digitally reconstructed radiographs of those fields were imported into the electronic portal imaging device software for verification purposes. Manually bony anatomy template matching was undertaken in an off-line environment to compare reference images to those acquired daily during treatment in order to extract the displacement errors. Displacements in antero-posterior and in crano-caudal were measured on the lateral portal image. Displacements in cranio-caudal